

Packet is Dead! Long Live Packet!

Is packet radio dead? In December 2000 a posting from Bill Vodall, WA7NWP, got some discussion going on the TAPR NetSIG mailing list, with thoughtful postings from a number of different viewpoints. Bill's question—"Is packet radio dead?"—is a very good one, worthy of some serious thought and discussion. I'll be returning to this theme in future columns. For this month, here's Bill's posting, and below it, my reply. I'll have some other postings in future columns. I'd very much like to hear from readers on this topic via e-mail, especially pointing me to packet (in the most liberal possible sense of "packet"—nearly anything digital) networks that are still operating.

WA7NWP NetSIG Message

Last night I attended a meeting of a local ham club. The discussion was on linked repeaters and IRLP [Internet Radio Linking Project—N8GNJ]. One of the presenters made the comment, "There's a packet node also at that site. It's coming down. Packet is dead!"

We have good activity on APRS, but that's a lightweight application making the best of low-bandwidth technology. We have a few BBSes still running.

I have no clue what state the Net/ROM (ish) networks are in around the country. Probably slowly coming apart.

High-speed packet has a few bright spots. N6GN's 2 Megabit system was for sale. The 56K repeater in Ottawa is gone (?). TAPR's data radio was reported on at DCC, but no discussion (or excitement) followed.

Is it true? Is amateur digital "packet" dead? Is it time to finish up the PSK31 soundcard interface and turn off the TNCs? For \$160 I can buy 802.11B and do short to medium range networking with no restrictions on content. How can we compete with that?

I have my own answers; just trying to start up a little discussion.—Bill, WA7NWP

N8GNJ NetSIG Message

Packet is dead! Long live packet!

I've made the case in various venues that it's simply not enough to "build the network." There has to be content to make it interesting to use. For better or for worse, the main source of content is now the internet. Building amateur wireless networks to provide some form of internet access is, I think,

the wave of the future. For one, you learn (quickly) about TCP/IP and wireless (and why it's tricky to make it work). For another, you're involved in one of the hottest technologies of the moment—wireless internet access.

As to Bill's comment about competing with 802.11 cards, I don't think we *should* think about "competing" with them, any more than we "compete" with the telephone or cell phone, Ethernet, or the internet itself. Do we "compete" with Linux or Windows? Uh, no. We use them as tools. I feel we should do the same with 802.11: Treat it the exact same way as we treat Ethernet.

Ever notice how many laptops there are at many gatherings of hams? Wouldn't it be cool if we could network them easily? You can: 802.11 supports a peer-to-peer mode called *ad-hoc*. Imagine coming into a room, turning on your laptop, and instantly being able to access the internet (someone else in the network has a dialup connection), begin monitoring APRS (someone set up a laptop running Linux and aprsd), connect to the local packet network, send e-mail, print, etc.

Hams should be the ones *integrating* all these cool technologies. Ham radio used to include the very savviest of "techies," and I think it will again. There's so much great wireless stuff to play with out there. Our key advantage is that we can *play* with it. We're not just "plug and pray" users. We *understand* the technologies—or at least we *should*. That's not to mention that we have access to technologies that no one else does—the APRS network, HF, etc.

I ought to write a book—no, wait, well, er . . . um . . . never mind. Maybe one of these days . . . real soon now.—Steve, N8GNJ

Comments

Now for some "extended" CQ-only commentary on the above exchange (and again, other postings on this discussion will occur in future columns).

I'm very serious about the use of 802.11, which is a series of standards for Wireless Local Area Networks that were developed by the Institute of Electrical and Electronics Engineers (IEEE) by its standards groups. Those of you in the computer industry will be hearing a lot about 802.11. If you carry a laptop for your company, it's likely you're already hearing about 802.11, and in 2001 we'll see a lot of laptops with 802.11 capability built-in. I have asked a well-known, very knowledgeable expert on 802.11 to consider writ-

ing a primer for amateur radio use of 802.11, and specifically the ad-hoc mode that I mentioned above.

"aprsd" is short for APRS daemon, basically a background process running on a Linux (or other UNIX) system that "gates" APRS data between an APRS node and similar systems in other parts of the country (or world) via the internet. aprsd was written by Dale Heatherington, WA4DSY; more information is available at <www.wa4dsy.net/aprs/index.html#aprservers>. The same thing can be accomplished with WinAPRS or MacAPRS, because (registered) versions of them include the lgate capability.

In the above exchange I didn't really, directly, answer Bill's question. I think the answer depends on how you define "packet." It really *does* center on the definition, because indisputably, some "packet" networks have folded for various reasons. Others are going strong. Digital activity in amateur radio is stronger than ever, but some would argue that's not "packet."

My philosophy of what amateur radio is, and by extension amateur radio digital/packet, has evolved considerably. Basically, I now consider amateur radio to be "hackers who do RF" (and *hackers* as used here is meant to capture the original, relatively noble meaning of *hacker*, which I differentiate from the criminally-minded "crackers"). I mean *hackers* as in non-professionals (in wireless) who are able to make existing equipment do new and different things. The term *hacker* is well understood in the computer industry; there's no equivalent term in the wireless industry for someone who accomplishes similar feats with RF. That amateur radio is "hackers who do RF" is as close as I can come to a good, working description of what place the hobby should be in the 2000s.

I think what's happening is there is a lot of bleeding-edge wireless experimentation going on in amateur radio, and awareness of such activities and systems isn't being made prominent enough. When pronouncements are made such as the one Bill quotes, there's ample evidence for that point of view, but not nearly as much evidence

to the contrary—at least that's easy to find, in one place. Oops . . . shame on us for not trumpeting our successes loudly enough, and double shame on us for allowing the perception to continue in the face of numerous threats to amateur radio such as spectrum grabs.

I think amateur radio is going through an incredibly painful evolution in the early 2000s, and the "symptoms" being described—"packet" nodes being taken down because "packet is dead"—are, in fact, symptoms of that evolution. What Bill didn't mention in his posting, and the person making the "dead" statement apparently didn't know (or have any interest in finding out), was that the Seattle area is home to four operational 9600 baud repeaters—one on 2 meters, three on UHF, and one that's portable on 222 MHz. There are three others in various stages of construction or conversion. There's a very active community of users on these systems—far more activity than what could reasonably be described as "dead."

Linux Update

In my November 2000 column I said that I considered the best distribution to use for amateur radio is Debian, soon to be version 7.0. I mistyped, and because I crowded my deadline a bit too closely, I didn't catch the error. I had *meant* to say SuSE, likely to be at version 7.0 by the time you read that column, and in fact, version 7.0 is now shipping. More information on SuSE is at <www.suse.com>. This isn't to say that Debian isn't a worthy distribution of Linux, but friends I trust have highly recommended SuSE as "most suitable" for amateur radio, and I'm passing along that recommendation. I'm likely to end up trying both and will report on the results in a future column.

Green Bay Professional Packet Radio

After publication of my first "Digital Wireless" column in the September 2000 issue of *CQ*, I received a nice note from Steve Lampereur, KB9MWR, about his organization, Green Bay Professional Packet Radio. Steve said:

I thought I'd write to you and let you know what we have been experimenting with here in Green Bay, Wisconsin. Our primary investigation has been with Part 15 [devices that don't require a license to operate—N8GNJ] wireless Ethernet cards. This includes modifications and full documentation of how to set up a low-cost network. We also have experimented with digital POCSAG paging, and a variety of other little side projects.

Please review our on-line information and documentation and see what you think.

- Using Part 15 wireless Ethernet cards for amateur radio: <<http://www.qsl.net/kb9mwr/wireless.html>>

- Our experimentation with 900 MHz and 2.4 GHz cards: <<http://www.gbonline.com/~multiplex/wireless/>>

Steve Lampereur, KB9MWR
<<http://www.qsl.net/kb9mwr>>
member of GBPPR research team

I found an "overall" link to GBPPR's projects at <www.qsl.net/n9zia/index.html>. Despite an inexplicable swipe at TAPR (an organization I greatly admire) on this page, I found a lot of interest here. Most important, GBPPR makes note of (at least their interpretation) the legalities of modifying Part 15 devices and operating them under Part 97 (US Amateur Radio) rules. That "detail" is noticeably absent in most other projects to modify Part 15 devices.

APRS at 9600 Baud

During a gathering of APRS users in western Washington late in 2000 I had one of those *déjà vu* moments. One of the issues discussed was modification of beaconing parameters so that high-profile digipeaters on 144.39 would not be so saturated with station beacons and allow some channel time for stations to come into the network and report their position. This is *déjà vu*, because in the early 1990s we were having the same discussion about digipeater networks.

As the discussion at the APRS gathering evolved, it became clear why this is so. One of the most highly prized aspects of APRS is that the infrastructure (digipeaters) is relatively simple, easy to maintain, and cheap. It appeared to be a genuine point of pride that most of the digipeaters in the area are "just a radio and a TNC." While some aspects of simplicity are indeed to be prized, simplicity has its downside, too, as the digipeater users are discovering. Used properly, digipeaters work reasonably well. The "used properly" aspect is that digipeaters simply don't "scale" well as usage increases. I remember that extensive thought was given to this, and my recollection is that there's a certain point at which a digipeater-based system collapses. In heavily congested digipeater systems the digipeater holds off its transmissions because it's hearing too many transmissions. User radios, which generally are not as high up as digipeaters and don't hear as much, keep on sending packets to the digipeater, not realizing that it's already overwhelmed with

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signals. These transmissions contribute to the "din" the digipeater hears, and the system approaches the point of congestive collapse so nothing gets through.

One answer to this problem is to begin to migrate from 144.39 and 1200 baud. There's been some discussion of such a migration, and the possibility seems a bit of a stretch for most APRS users.

In theory, it would be possible for an area to agree to a local "deviation" from 144.39 and move local users to another frequency, leaving 144.39 for transient users. The problem is that such a move "breaks" the sharing of position information with all APRS users in an area. Also, the use of 9600 baud equipment has been proposed—not a bad idea, since the Kenwood "APRS" radios include 9600 baud capability as standard. Partially as an experiment, and partially as a rejoinder to a statement made to the effect that it would be many years before APRS was used on 9600, Bill, WA7NWP, got APRS working on 9600 baud before the end of the millennium.

Bill set up an "aprsd" station with the TNC and radio being 9600 baud gear, operating on the 441.825 9600 baud bit-regen repeater in the Seattle area. On the "back end," Bill simply hooked up his internet connection, and now any APRS traffic on the 441.825 repeater is just additional Igate traffic from and to the Seattle area.

Bill's alias is "aprsdRDM" (he lives in Redmond, Washington), and on the air this system is WA7NWP-2.

One key advantage of operating APRS on a 9600 baud repeater is that there aren't any bandwidth constraints; it can take the "full feed" of the Igate system, including international traffic.

Bill's work illustrates one of my key definitions of "Advanced Amateur Radio": He is having fun learning and experimenting.

News from TAPR

One problem at the moment is that there hasn't been much news from TAPR. One of the casualties of the recent reorganization of TAPR's board of directors is there's been a distinct lack of communications about what is going on in TAPR, which the group is working to address. It was revealed on TAPR's "Organizational" mailing list (tapr-org) that Barry McLarnon, VE3JF, has also resigned from the TAPR board of directors, leaving a total of two vacancies with the resignation in late 2000 of Greg Jones, WD5IVD.

As part of the NetSIG message thread mentioned above, John Ackermann, N8UR, TAPR president, had this to say about a future TAPR project:

On the SDR [Software Defined Radio—N8GNJ] front, TAPR has committed to help make SDR kits available to the ham com-

munity, and to support those who want to develop code to run on these engines. We hope to announce our first kit shortly, and we already host a DSP mailing list where coders have been discussing software modern design techniques for quite a while. TAPR sees the Software Defined Radio as a perfect opportunity for our "enabling technology" philosophy; by making general-purpose SDR engines, and the tools to program them, available, we enable hams to once again become experimenters on the leading edge of communications technology.

New Toys at N8GNJ

A new Kenwood TH-D7AG has come into my life, and the first thing I noticed about it was that it's the first radio I've ever used where I had to read the manual to figure out how to set the squelch. However, it's certainly fun and interesting. Another toy that will be fun to use with the TH-D7AG at some point is my new Palm IIIc (color screen, 8 MB RAM, charges while in the synch cradle). Wireless capability on Palm devices is still evolving, and I prized the utility of color on the Palm IIIc and the price was reasonable. I fully expect to upgrade again in a year or so to a device that includes better wireless capability than what is available currently. Next up, a GPS receiver . . .

<www.packetradio.com>

Buck Rogers, K4ABT, CQ's former packet radio columnist, is still actively maintaining his packet "encyclopedia" at <www.packetradio.com>. It's one of my primary sources of reference when I'm working with packet gear, and Buck offers many unique products on the site, including a number of commercial-grade two-way radios pre-modified for packet use.

Major Events on My Calendar

The Dayton Hamvention, May 18–20, 2001. Attending Dayton annually has become a habit I'm loath to break, even though it now means a plane trip from Seattle rather than a reasonable drive down from Cleveland as it used to be for me years ago. This will be my first Dayton as a CQ columnist, and I hope to see and report on new and exciting digital products being shown there, making good use of my digital camera. I plan to be around the TAPR and CQ booths for at least part of my time there. A major event, as always, during Dayton is the TAPR PacketBash dinner, and of course the TAPR and other digital forums.

As always, comments and questions on these and other topics are welcome.

73, Steve, N8GNJ

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